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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
[illegible]	[illegible]	CALDWELL J	[illegible]

IM31/0526

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EXAMINER	
LORENGO	
ART UNIT	**PAPER NUMBER**
[illegible]	

DATE MAILED: 05/26/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/962,700	J. Michael Caldwell
Examiner	**Group Art Unit**
Jerry A. Lorengo	1734

☐ Responsive to communication(s) filed on _____.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *three (3)* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1 and 133-197* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1 and 133-197* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). *6*

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

(1)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 133-140, 143, 144, 146-154, 160-165, 167-172, 179-183, 185, and 188-197 rejected under 35 U.S.C. 103(a) as being unpatentable over Caldwell et al. in view of Billmeyer, Jr.

Caldwell et al. discloses a method and apparatus for the placement of a polymer (water-swellable elastomer) into a porous (breathable fabric) web. The applicant should note that all fabric webs have a three-dimensional structure. With reference to the figures below, Caldwell et al. discloses that the application or placement of a polymer composition into a porous web is accomplished by using a floating knife coater. Figure 1 shows the fabric being removed from a storage roll 6 over a roll 4 which supports the viscous solution of elastomer (polymer) 3. The knife 2 is shown as depressing the fabric 1 as it spreads and forces the polymer 3 into the fabric (column 11, lines 59-65).

FIG. 1

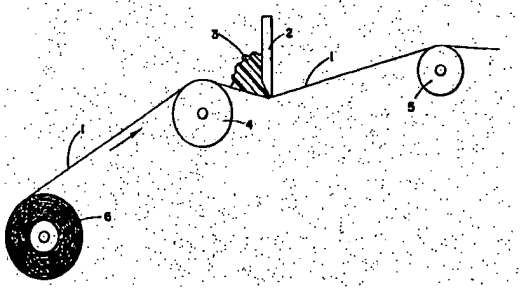
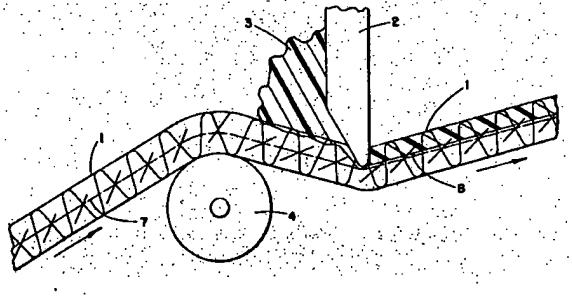


FIG. 2



Caldwell et al. discloses that Figure 2 is an enlarged diagrammatic illustration showing a cross-sectional view of the fabric 1 as it is impregnated with the polymeric material. The open angle on coating knife 2 is shown as metering a thin layer of elastomer solution 3 onto the surface of the fabric 1. The knife 2 also compresses the fabric 1 and forces the elastomer 3 to be deposited in the fabric 1 above the center plane 7 (column 11, lines 66-74).

Most interestingly, Caldwell et al. discloses that it is readily realized that by adjusting the blade angle, fabric tension, elastomer solution solids and viscosity, and rate of fabric movement that varying amounts of elastomer can be deposited within any volume of the fabric. Other methods of applying the elastomer present special problems but the principal is essentially the same as described above (column 11, lines 74-75; column 12, lines 1-6).

Caldwell et al. discloses that after the elastomer is applied to the fabric in a suitable solvent, curing is accomplished by heat. This heating can be done in autoclaves, festoon ovens, or continuous roll ovens. The exact time and temperature required for adequate cure depends upon the elastomer, the fabric, and the curing system (column 12, lines 7-12).

Caldwell et al. discloses the polymeric coating itself is made predominantly of a polymer in solvent followed by the addition of additives such as curing agents, pigments, plasticizers, or inhibitors. He also discloses the amount of coating applied by any technique is dependent upon the nature of the fabric being treated, the nature of the elastomer being applied, and the degree of air permeability which is desired (column 9, lines 49-71).

Although Caldwell et al. discloses the general method and apparatus for the placement of a polymer composition into a porous web, he does not specifically disclose that the polymer is shear thinned upon application with the knife to substantially reduce its viscosity.

Billmeyer, Jr., however, discloses that two types of deviation from Newtonian flow are commonly observed in polymer solutions and melts. One is shear thinning, a reversible decrease in viscosity with increasing shear rate. Shear thinning results from the tendency of the applied force to disturb the long chains from their favored equilibrium conformation causing elongation in the

direction of shear. An opposite effect, shear thickening, in which viscosity increases with increasing shear rate, is rarely observed in polymers (page 173).

Therefore, it would have been obvious to one of ordinary skill in the art that the polymer composition applied by the method and apparatus of Caldwell et al., would inherently undergo shear thinning with a substantial decrease in viscosity motivated by the fact that Billmeyer, Jr. discloses that most polymers undergo shear thinning with increasing shear rate.

Finally, with reference to claims 167-172, it would have been obvious to one of ordinary skill in the art to supply the web movement with a nip formed by two counter-rotating rollers motivated by the fact that such nip drives are well known in the art. Furthermore, it would have been obvious to one of ordinary skill in the art to supply either one or both of the rollers with a rubber or metal surface motivated by the fact that the roller surface determines the degree of friction that the nip can bestow upon the web being driven.

(2)

Claims 142, 145, 155-159, and 187 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as combined in section (1) above, in further view of Linscott.

Although the references as combined in section (1), above disclose methods and apparatus for the placement of a polymer composition into a porous web by shear thinning, they do not specifically disclose that the apparatus utilizes two or more blades spaced apart from one another which are utilized in the placement of the polymer into the porous web.

Linscott, however, in his method and apparatus for impregnating fibrous sheet material, discloses the use of multiple blades spaced apart from one another on both sides of the web for placement of a polymer composition into a porous web.

Therefore, it would have been obvious to one of ordinary skill in the art to supply the method and apparatus taught by the references as combined in section (1), above, with two or more blades spaced apart from one another motivated by the fact that Linscott teaches that such a method and apparatus results in distribution and removal of excess composition as desired by a suitable

arrangement of wiper and scraper knives frictionally engaging the upper and lower faces of the sheet material (page 1, column 2, lines 25-28).

(3)

Claims 175-178 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as combined in section (2), above, in further view of Marteness.

Although the references as combined in section (2), above disclose methods and apparatus for the placement of a polymer composition into a porous web by shear thinning with two or more blades determinedly spaced apart from one another, they do not specifically disclose that the blades may be vibrated during coating.

However, it would have been obvious to one of ordinary skill in the art to vibrate the coating knives or blades during coating motivated by the fact that Marteness, in his method and apparatus for the placement of a polymer composition into a porous web, teaches that a more uniform coating is obtained if the coating knife is vibrated (column 3, lines 48-49).

(4)

Claims 141, 166, 173, 174, 184, and 186 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as combined in section (2), above.

Although the references as combined in section (2), above disclose methods and apparatus for the placement of a polymer composition into a porous web by shear thinning, they do not specifically disclose that the web is transversely tensioned during coating and curing. They also do not specifically disclose, as per applicant claims 173 and 174, that the resonance of the coating blades in dampened or that, as per applicant claims 141 and 166, that the blades have a specific finish or are heated during application.

However, it would have been obvious to one of ordinary skill in the art to provide the web being coated in either a longitudinally and/or transversely tensioned manner during coating and curing motivated by the fact that such tensioning would, in-part, determine the degree to which the polymer impregnates the web during coating and the degree of openness or porosity of the finished web.

It would have been obvious to one of ordinary skill in the art to supply the coating knives with resonance dampening motivated by the fact that resonance dampening avoids blade chattering which can result in inconsistent coating and the formation of ripples.

Finally, it would have been obvious to one of ordinary skill in the art to supply the coating knives with any finish as well as preferentially heating or cooling the knives during coating motivated by the fact that such knife parameters, in part, determine the viscosity of the polymer as it is placed within the web. That is, the knife finish would effect the shear rate and thus the viscosity of the polymer during coating while the knife temperature would effect to viscosity of the polymer by the equation below:

$$\eta = Ae^{-(E/RT)}$$

where:

η = viscosity
A = constant
E = activation energy for viscous flow
R = gas constant
T = temperature

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patent Examiner Jerry Lorengo whose telephone number is (703) 306-9172. The applicant should note that official communications regarding the instant application may be forwarded directly to the examiner via facsimile at (703) 305-7115.

JAL
May 3, 1999

David A. Simmons
Supervisory Patent Examiner
Technology Center 1700